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ENVIRONMENTAL PROTECTION AGENCY

[EPA-R09-OAR-2013-0126; FRL-9788-3]

**Official Release of EMFAC2011 Motor Vehicle Emission Factor
Model for Use in the State of California**

AGENCY: Environmental Protection Agency (EPA)

ACTION: Notice of Availability.

SUMMARY: EPA is approving and announcing the availability of the latest version of the California EMFAC model (short for Emission Factor) for use in state implementation plan (SIP) development and transportation conformity in California. EMFAC2011 is the latest update to the EMFAC model for use by California state and local governments to meet Clean Air Act (CAA) requirements. The new model, which is based on new and improved data, calculates air pollution emissions factors for passenger cars, trucks, motorcycles, motor homes and buses. Today's notice also sets the date after which EMFAC2011 is required to be used statewide in all new regional emissions analyses and carbon monoxide (CO), particulate matter of ten microns or less (PM₁₀) and fine particulate matter (PM_{2.5}) hot-spot analyses for transportation conformity determinations in California. Since the EMFAC model is used only in California, EPA's approval of the model does not affect MOVES model users in other states.

DATES: EPA's approval of the EMFAC2011 emissions model for SIP and conformity purposes is effective [Insert date of publication in the Federal Register]. EMFAC2011 must be used for all new regional emissions analyses and CO, PM₁₀ and PM_{2.5} hot-spot analyses that are started on or after [Insert date six months after date of publication in the Federal Register].

FOR FURTHER INFORMATION CONTACT: Karina O'Connor, oconnor.karina@epa.gov, (775) 433-8176, Air Planning Office (AIR-2), Air Division, U.S. EPA, Region 9, 75 Hawthorne Street, San Francisco, California, 94105-3901.

SUPPLEMENTARY INFORMATION: Copies of the official version of the EMFAC2011 model are available on the California Air Resources Board (CARB) web site:

<http://www.arb.ca.gov/msei/modeling.htm> (model, technical support documents, etc).

I. Background

A. What Is the EMFAC Model?

The EMFAC model is a computer model that can estimate emission rates for on-road mobile sources ("motor vehicles") for calendar years from 1990 to 2035 operating in California. Pollutant emissions for hydrocarbons (HC), CO, nitrogen oxides (NO_x), PM₁₀, PM_{2.5}, lead, carbon dioxide (CO₂), and sulfur oxides are output from the model. Emissions are calculated for forty-

two different vehicle classes composed of passenger cars, various types of trucks and buses, motorcycles, and motor homes.

EMFAC is used to calculate current and future inventories of motor vehicle emissions at the state, air district, air basin, or county level. EMFAC contains default vehicle activity data, and the option of modifying that data, so it can be used to estimate a motor vehicle emissions inventory in tons/day for a specific year, month, or season, and as a function of ambient temperature, relative humidity, vehicle population, mileage accrual, miles of travel and speeds. Thus the model can be used to make decisions about air pollution policies and programs at the local or state level. Inventories based on EMFAC are also used to meet the federal CAA's SIP and transportation conformity requirements. Transportation conformity is required under CAA section 176(c) to ensure that federally supported transportation plans, transportation improvement programs (TIPs), and highway and transit projects are consistent with ("conform to") the purpose of the SIP. Conformity to a SIP means that a transportation activity will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards (NAAQS) or interim milestones. EPA's transportation conformity regulations (40 CFR Parts 51.390 and 93) describe how federally

funded and approved highway and transit projects meet these statutory requirements.

B. What Versions of EMFAC Are Currently in Use in California?

Most SIPs in California were developed using EMFAC2007 (released by CARB in October 2007) or EMFAC2002 (released by CARB in October 2002). EPA approved EMFAC2007 on January 18, 2008 (73 FR 3464) and approved EMFAC2002 on April 1, 2003 (68 FR 15720) for all areas in California.

EMFAC2007 was considered a major update to previous versions of EMFAC and most SIPs in California were updated with EMFAC2007 in the 2007-2008 timeframe. EMFAC2007 included new data and methodologies regarding calculation of motor vehicle emissions, and revisions to implementation data for control measures.

C. Why Is EPA Announcing Its Approval of the EMFAC Model?

CAA section 172(c)(3) and 40 CFR 51.112(a)(1) require that SIP inventories be based on the most current, accurate, and applicable models that are available at the time the SIP is developed. CAA section 176(c)(1) requires that the latest emissions estimates be used in conformity analyses. EPA approves models that fulfill these requirements.

Under 40 CFR 93.111(a), EPA must approve new versions of EMFAC for SIP purposes before they can be used in transportation

conformity analyses. In an April 6, 2012 letter, CARB requested that EPA approve EMFAC2011 for use in developing SIPs and in determining conformity in California.¹ EMFAC2011 is a significant change from previous EMFAC models with a new model user interface and is capable of calculating motor vehicle emissions for all California areas. EMFAC2011 is being approved as the latest emissions model for statewide use in SIP development and emissions analyses for conformity purposes. Since the EMFAC model is only used in California, EPA's statewide approval of the model does not affect MOVES emissions factor model users in other states.

II. EPA Action

A. What Version of EMFAC Is EPA Approving?

In this notice, EPA is approving and announcing that EMFAC2011 is available to use in statewide California SIP development and for regional emissions analyses and CO, PM₁₀ and PM_{2.5} hot-spot analyses for transportation conformity. EMFAC2011 was developed by CARB and transmitted for approval to EPA on April 6, 2012.

¹ The EMFAC2011 model and supporting information is available for downloading at <http://www.arb.ca.gov/msei/modeling.htm>. Technical documentation explaining the changes to the model and the technical foundations for the model is available at <http://www.arb.ca.gov/msei/emfac2011-documentation-final.pdf>.

The EMFAC2011 model is composed of a new modular structure that will facilitate future model updates and allow CARB to incorporate updated information about truck and bus activity and emissions data into the model. The three major modules of EMFAC include EMFAC-LDV, EMFAC-HD and EMFAC-SG. EMFAC-LDV can be used to estimate emissions for gasoline powered on-road vehicles and smaller on-road diesel vehicles and urban transit buses. EMFAC-HD provides emissions factors for heavy-duty diesel trucks and buses. EMFAC-SG allows users to run one tool for SIP inventories and regional emissions analyses to combine the emissions factors from both EMFAC-LDV and EMFAC-HD with user defined vehicle miles of travel and speeds, combine emissions from multiple model-defined subareas and incorporate reductions associated with CARB's Pavley and Low Carbon Fuel standard regulations.

CARB developed the EMFAC-SG module to provide users, including transportation planners, with a simplified method to generate emissions with different future growth scenarios for specific geographic areas needed for transportation conformity and SIP development. CARB also developed the EMFAC-PL tool for use for doing multiple model runs to extract emissions factors for project-level analyses needed for hot-spot analyses.² Due

² The EMFAC-PL tool is available at: <http://www.arb.ca.gov/msei/modeling.htm>. In an email to EPA dated 2/08/2013, CARB clarified that the EMFAC-PL tool is available for use in project-level assessments.

to the modular structure of the EMFAC2011 model, to obtain emissions factors for project-level analyses, an EMFAC2011 user would have to run multiple modules to generate emission factors. Therefore ARB has developed the EMFAC-PL tool to produce emissions factors for projects that are consistent with the default assumptions in EMFAC2011. For projects that have site-specific ambient temperature and relative humidity profiles, project-specific vehicle age distributions and/or project-specific rest and soak time data, the user will have to use a more detailed approach other than EMFAC-PL that requires getting emissions factors from EMFAC-LDV and EMFAC-HD. As discussed later in this notice, EPA is consulting with CARB to provide updated EMFAC guidance for how to apply the EMFAC2011 emissions model through either the EMFAC-PL tool or the more detailed approach that would not use EMFAC-PL.

B. What Analyses Can EMFAC2011 Be Used For?

EPA is approving the model to estimate regional emissions of HC, CO, NO_x, PM₁₀, PM_{2.5}, lead, and sulfur oxides.³ However, EMFAC2011 will only be used in transportation conformity for pollutants and precursors that affect transportation-related emissions, e.g., HC, NO_x, CO, PM₁₀ and PM_{2.5}.

³ EPA notes that EMFAC2011 can be used for CO₂ emissions analyses as well, but there are no SIP or transportation conformity requirements for greenhouse gases (GHGs).

EPA is also approving EMFAC2011 to estimate CO, PM₁₀ and PM_{2.5} emissions for conformity hot-spot analyses involving individual transportation projects. A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. This analysis is conducted on a smaller scale than a nonattainment or maintenance area, e.g., for a congested roadway intersection.

EPA also notes that today's approval action does not impact what methodology is required for calculating re-entrained road dust for regional PM₁₀ and PM_{2.5} SIPs and transportation conformity analyses. EMFAC2011's PM₁₀ and PM_{2.5} estimates do not include such emissions. When applicable, PM₁₀ and PM_{2.5} nonattainment and maintenance areas are required to use EPA's AP-42 road dust method for calculating road dust emissions, unless a local method is approved in advance by EPA.⁴ In addition, EMFAC2011 does not estimate ammonia emissions; air quality and transportation agencies should contact the EPA

⁴ For further information, see EPA's February 4, 2011 Notice of Availability for the January 2011 AP-42 Method for Estimating Re-entrained Road Dust from Paved Roads (76 FR 6328). Also, for using AP-42 for unpaved roads, see EPA's August 2, 2007 memorandum, "Policy Guidance on the Use of the November 1, 2006, Update to AP-42 for Re-entrained Road Dust for SIP Development and Transportation Conformity."

Regional Office if ammonia emissions estimates are needed for SIPs or regional conformity emissions analyses.

C. Why Is EMFAC2011 Being Approved for PM₁₀ and PM_{2.5} Hot-spot Analyses At This Time?

On December 20, 2010, EPA published a notice which announced the availability of EPA guidance documents for completing quantitative hot-spot analyses and approved the use of the MOVES and the EMFAC2007 models for use in quantitative PM₁₀ and PM_{2.5} hot-spot analyses (75 FR 79370). That notice started a two-year grace period requiring project sponsors to use EMFAC2007 for new quantitative PM₁₀ and PM_{2.5} hot-spot analyses in California, for conformity determinations involving projects of local air quality concern.

As with EMFAC2007, EMFAC2011 is capable of assessing project-level emissions for PM₁₀ and PM_{2.5} hot-spot analyses, therefore EPA is approving EMFAC2011 for use in quantitative PM hot-spot analyses for transportation conformity purposes within California. As mentioned earlier, CARB has developed the EMFAC-PL tool, as a simplified method to extract the appropriate emissions factors for alternative vehicle data and speeds from EMFAC2011 for appropriate projects. In today's notice, EPA recognizes the importance of this tool for ensuring that project-level conformity analyses are done in a consistent and

accurate matter. To that end, we are also approving the EMFAC-PL tool for project-level conformity analyses, and allowing other tools to be approved by EPA, if such alternate project-level tools provide for similar performance in applying EMFAC2011 emissions factors for appropriate projects.⁵ EPA is updating Section 5 and related appendices of our PM hot-spot quantitative guidance to describe how to use the EMFAC2011 model for PM hot-spot analyses.⁶ EPA's revised guidance will include details on what PM hot-spot analyses can rely on the EMFAC-PL tool and which projects will require a different approach to obtain the appropriate project-level EMFAC2011 emission factors. EPA intends to complete its PM hot-spot guidance revision in the near future. When completed, the updated guidance will be made available on EPA's website:

www.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm.

D. Why Does EPA Consider EMFAC2011 As a Major Update to EMFAC?

EMFAC2011 includes significant changes to its model interface, new data and methodologies regarding calculation of

⁵ EPA would approve any alternate project-level tool through a letter, after completion of its review of model documentation showing consistency with the EMFAC-PL approach.

⁶ "Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas" [EPA-420-B-10-040]. See www.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm.

motor vehicle emissions and revisions to implementation data for control measures. EMFAC2011 includes updated data on truck activity, and emissions reductions associated with the 2010 Truck and Bus rule, supporting new estimates of emissions from heavy-heavy duty diesel trucks and buses. Motor vehicle fleet age, vehicle types and vehicle population have also been updated based on 2009 California Department of Motor Vehicle (DMV) data. EMFAC2011 incorporates new temperature and humidity profiles. Each of these changes impact emission factors for each area in California. In addition to changes to truck activity, EMFAC incorporates updated vehicle miles traveled (VMT) for all vehicle classes. The new model interface EMFAC-SG module will allow users to update the default VMT data and speed profiles by vehicle class for different future scenarios. CARB's web site describes these and other model changes at:

<http://www.arb.ca.gov/msei/emfac2011-documentation-final.pdf>.

E. How Were Stakeholders and the Public Involved in the EMFAC Development Process?

Since 2010, CARB has held a series of public workshops to discuss emissions inventory updates related to California's In-Use Heavy-Duty Diesel Fueled Truck and Bus regulation ("Truck and Bus Regulation"), and to receive comments on the regulations and the resulting changes in the emissions inventory. Since the

major changes to the EMFAC model are associated with incorporation of the Truck and Bus Regulation into the model, the technical foundations of these changes were presented to the public in these workshops. CARB also conducted extensive beta testing of interim versions of the model with air districts and Metropolitan Planning Organizations (MPOs). These stakeholders had the opportunity to request briefings with CARB staff and provide them with comments and suggestions to improve the model. EPA was included in those discussions and our suggestions were incorporated into the material available on the CARB EMFAC2011 public web site. CARB also developed and posted training modules for EMFAC2011 and supports a mobile source emissions inventory email listserv to announce updates and changes to the EMFAC supporting material.⁷

CARB also released a series of technical memos that describe each update to the model and public presentations that summarize the changes from earlier versions of the model. The technical memos are available on CARB's web site at: <http://www.arb.ca.gov/msei/supportdocs.htm> and at [http://www.arb.ca.gov/msei/categories.htm#onroad motor vehicles](http://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles) Specific changes incorporated into the EMFAC2011 model are also discussed in <http://www.arb.ca.gov/msei/emfac2011-documentation->

⁷ To subscribe to CARB's listserv for Mobile Source Emission Inventory development, see "Join our MSEI listserv" at www.arb.ca.gov/msei/msei.htm.

final.pdf. All presentations from the public workshops are available on the CARB web site at:

<http://www.arb.ca.gov/msprog/onrdiesel/workshops.htm>.

F. Will a Transportation Conformity Grace Period Be Set By This Approval?

Yes. The transportation conformity rule (40 CFR 93.111) requires that conformity analyses be based on the latest motor vehicle emissions model approved by EPA for SIP purposes for a state or area. Section 176(c)(1) of the CAA states that

" . . . [t]he determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates. . . ."

When EPA approves a new emissions model such as EMFAC2011, EPA will consult with the U.S. Department of Transportation (DOT) to establish a grace period before the model is required for conformity analyses (40 CFR 93.111(b)). However, areas have the option of using the new model prior to the end of the grace period. The conformity rule provides for a grace period for new emissions models of between 3 to 24 months. In consultation with the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), EPA considers many factors in

establishing the length of the grace period, including the degree of change in emissions models and the effects of the new model on transportation planning in order to assure conformity (40 CFR 93.111).

Upon consideration of all of these factors, EPA is establishing a 6-month grace period before EMFAC2011 is required for the following conformity analyses:

- All new HC, NO_x, PM₁₀, PM_{2.5} and CO regional emissions analyses (e.g., supporting transportation plan and TIP conformity determinations); and
- All new CO, PM₁₀ and PM_{2.5} hot-spot analyses supporting project-level conformity determinations.

The grace period begins on [Insert date of publication in Federal Register] and ends on [Insert date 6 months after publication in Federal Register]. As discussed earlier in the notice, EMFAC2011 incorporates significant changes to the model interface and procedures used to estimate both emissions for regional emissions analysis and emissions factors for hot-spot analyses for CO and PM. While these changes are significant, the model has been available for review by air quality and transportation agencies, consultants and the public since September 2011.

For application of EMFAC2011 at the project level, CARB's EMFAC-PL tool for appropriate projects has just recently been released, therefore project sponsors developing project-level analysis may need some time to familiarize themselves with this tool. EPA is also updating our PM hot-spot quantitative guidance to include the new EMFAC2011 procedures.

Therefore, it is appropriate to set a 6-month grace period to allow all areas in California to incorporate these new procedures in conformity hot-spot analysis⁸ and apply the changes to the model structure and updated planning assumptions incorporated in EMFAC2011 in a timely manner. In the interim, new quantitative PM hot-spot analyses that are started prior to the end of the EMFAC2011 grace period can be based on EMFAC2007 and EPA's existing PM hot-spot guidance and subsequently completed.

When the grace period ends on [Insert date 6 months from publication in Federal Register], EMFAC2011 will become the only approved motor vehicle emissions model for all new regional and CO, PM₁₀ and PM_{2.5} hot-spot transportation conformity analyses across California. In general, this means that all new HC, NO_x, PM₁₀, PM_{2.5}, and CO regional conformity analyses and CO, PM₁₀ and

⁸ EMFAC-PL or an alternative method or tool must be used for new EMFAC2011 analyses of appropriate projects after the 6-month grace period. If EPA approves alternative tools to the EMFAC-PL tool, EPA does not intend to establish a new 6-month grace period.

PM_{2.5} hot-spot analyses started after the end of the 6-month grace period must be based on EMFAC2011, even if the SIP is based on an earlier version of the EMFAC model.

G. Can Areas Use Any Other Models During the Grace Period?

Yes, the conformity rule provides some flexibility for regional emissions analyses that are started before the end of the grace period. Analyses that begin before or during the grace period may continue to rely on EMFAC2007. The interagency consultation process should be used if it is unclear if an EMFAC2007-based analysis was begun before the end of the grace period. When the grace period ends on [Insert date 6 months from publication in Federal Register], EMFAC2011 will become the only approved motor vehicle emissions model for regional emissions analyses for transportation conformity in California.

CO, PM₁₀ and PM_{2.5} hot-spot analyses for project-level conformity determinations can be based on EMFAC2007 if the analysis was begun before the end of the grace period, and if the final environmental document for the project is issued no more than three years after the issuance of the draft environmental document (see 40 CFR 93.111(c)). Therefore new quantitative and qualitative analysis already underway that were started before the end of the grace period using EMFAC2007 can be completed as long as 93.111(c) is satisfied. The interagency

consultation process should be used if it is unclear whether an EMFAC2007-based analysis is covered by the circumstances described above.

H. Future Updates to EMFAC

On January 31, 2006, CARB submitted a letter to EPA and to the California Division of the FHWA indicating the State's intention to make future revisions to update EMFAC. These EMFAC updates would reflect, among other new information, updated vehicle fleet data every three years. In California, MPOs and Air Districts have not been able to update vehicle fleet data embedded into EMFAC. The EPA/USDOT December 2008 guidance on latest planning assumptions and EPA's July 2004 final rule indicate that new vehicle registration data must be used when it is available prior to the start of new conformity analyses and that states and MPOs are strongly encouraged to update the data at least every five years. CARB reaffirmed their commitment to keeping the latest planning assumptions included in EMFAC updated on a three-year cycle in the April 18, 2007 EMFAC submittal letter. The next update to the planning assumptions in EMFAC is expected in 2014 or 2015 which would most likely also include updates to the emissions factors of the model as well.

III. Summary of EPA Actions

As described in this notice, EPA is approving EMFAC2011 as

submitted by CARB on April 6, 2012 with the following limitations and conditions:

- (1) The approval is limited to California.
- (2) The approval is Statewide and applies to estimation of emissions of HC, CO, NO_x, PM₁₀, PM_{2.5}, lead, and sulfur oxides. However, EMFAC2011 will be used in transportation conformity regional emissions analyses for pollutants and precursors that are applicable in a given nonattainment or maintenance area. EPA is approving all components of EMFAC2011, specifically EMFAC-SG, EMFAC-LDV and EMFAC-HD. EPA is also approving EMFAC2011 and the EMFAC-PL tool to estimate project-level emissions for CO, PM₁₀ and PM_{2.5} conformity hot-spot analyses.
- (3) A 6-month statewide transportation conformity grace period will be established beginning [Insert date of Federal Register publication] and ending [Insert date 6 months from date of Federal Register publication] for the transportation conformity uses described in (2) above.

Dated: February 22, 2013

Jared Blumenfeld,
Regional Administrator,
Region IX.

03/05/2013 at 8:45 am; Publication Date: 03/06/2013]